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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,122	09/10/2003	Kent Kuohua Chang	9165-US-PA-0P	2121

31561 7590 06/15/2004

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE
7 FLOOR-1, NO. 100
ROOSEVELT ROAD, SECTION 2
TAIPEI, 100
TAIWAN

EXAMINER	
LINDSAY JR, WALTER LEE	
ART UNIT	**PAPER NUMBER**
2812	

DATE MAILED: 06/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/605,122	CHANG, KENT KUOHUA	
	Examiner	Art Unit	
	Walter L. Lindsay, Jr.	2812	

-- The MAILING DATE of this communication appears on th cover sh t with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-25 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 23-25 is/are allowed.

6)☒ Claim(s) 1-3,7,11-17 and 22 is/are rejected.

7)☒ Claim(s) 4-6,8-10 and 18-21 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office action is in response to the application filed 9/10/2003.

Currently, claims 1-25 are pending.

Specification

1. The disclosure is objected to because of the following informalities: In paragraph [0031] line 11 "LLD" should be replaced with "LDD".

Appropriate correction is required.

2. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 7, 11-17 and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Xiang (U.S. Patent No. 6,600170 filed 12/17/2001) .

Xiang shows the method as claimed, in Figs. 1-6 and corresponding text as: forming a silicon germanium (SiGe) (14) layer on a substrate (10) (col. 3, lines 24-45); forming a silicon layer (16) on the SiGe layer (col. 3 lines 46-53); forming a gate oxide layer (32) on the silicon layer (col. 4, lines 42-55); forming a gate structure (48) on the gate oxide layer (col. 5, lines 4-22); forming a lightly doped drain region (36) in the silicon layer (col. 4, line 56- col. 5, line 3); forming a spacer (40) on a sidewall of the

gate structure (col. 5, lines 4-22); performing a doping process on the silicon layer to form a heavily doped drain region (43) beside the lightly doped drain region, and on the gate structure (col. 5, lines 4-22); forming a cap layer over the substrate (col. 5, lines 4-22); performing an annealing process (col. 5, lines 4-22); and removing the cap layer (claim 1) (col. 5, lines 4-22). Xiang shows the doping process is conducted using n-type dopants (claim 2) (col. 4, line 56- col. 5, line 3). Xiang shows the doping process is conducted using arsenic ions.(claim 3) (col. 1, lines 44-53). Xiang shows the cap layer comprises a silicon oxide layer (claim 7) (col. 5, lines 4-22). Xiang shows the heavily doped drain region is formed in the silicon layer (claim 11) (col. 4, line 56- col. 5, line 3). Xiang shows the heavily doped drain region is formed in the silicon layer and the silicon germanium layer (claim 12) (col. 4, line 56- col. 5, line 3). Xiang shows the heavily doped drain region is formed in the silicon germanium layer (claim 13) (col. 4, line 56- col. 5, line 3). Xiang shows the gate structure is formed with polysilicon or silicon germanium (claim 14) (col. 5, lines 4-22). Xiang shows the silicon layer is strained (claim 15) (col. 3, lines 46-53). Xiang also shows the method as claimed in corresponding text as: providing a silicon substrate (16) (col. 3 lines 46-53); forming a gate electrode (48) over the silicon substrate (col. 5, lines 4-22); introducing n-type dopants to the silicon substrate to form source/drain regions in the substrate beside the gate electrode and to the gate electrode (col. 5, lines 4-22); forming a cap layer the doped polysilicon gate(col. 5, lines 4-22) ; performing an annealing process (col. 5, lines 4-22); and removing the cap layer (claim 16) (col. 5, lines 4-22). Xiang shows the doping process is conducted using arsenic ions.(claim 17) (col. 1, lines 44-53). Xiang

shows the gate structure is formed with polysilicon or silicon germanium (claim 22) (col. 5, lines 4-22).

Allowable Subject Matter

4. Claims 4-6, 8-10 and 18-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. Claims 23-25 are allowed.

6. The following is a statement of reasons for the indication of allowable subject matter: the prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...wherein a dosage of the doping process is about 3E15 to about 5E15 ions/cm^2 , as required by claim 4 and claim 18, as it depends to claim 1 and claim 16 respectively.

The prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...wherein the doping process is conducted with an implant energy of about 60 KeV, as required by claim 5, as it depends to claim 1.

The prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...wherein the cap layer is about 300 angstroms to about 700 angstroms thick, as required by claim 6, as it depends to claim 1.

The prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...wherein the annealing process is conducted at 1000 degrees Celsius for about 10 to 20 seconds, as required by claim 8 as it depends from claim 1.

The prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...further comprises forming a silicide layer a top the gate structure and the heavily doped drain region, as required by claim 9 as it depends from claim 1.

The prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...wherein the silicide layer is selected from the group consisting of tungsten silicide, titanium silicide, nickel silicide, magnesium silicide, platinum silicide and palladium silicide, as required by claim 10 as it depends from claim 1.

The prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...wherein the annealing process comprises a rapid thermal annealing process conducted at about 1000 degrees Celsius for about 10 to 20 seconds, as required by claim 19, as it depends on claim 16.

The prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...wherein the cap layer is about 300 to about 700 angstroms thick, as required by claim 20 as it depends on claim 16.

The prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...wherein the cap layer comprises a silicon oxide layer deposited at about 400 degrees to 500 degrees Celsius, as required by claim 21 as it depends on claim 16. Lastly the prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...implanting arsenic ions to the strained silicon layer and a top surface of the silicon germanium layer to form a heavily doped drain region beside the lightly doped drain region and to the gate structure;

forming a cap layer over the substrate;

performing a rapid thermal annealing process;

removing the cap layer;

forming a nickel silicide layer atop the gate structure and the heavily doped drain region, as required by claim 23.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter L. Lindsay, Jr. whose telephone number is (571) 272-1674. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John F Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

WLL
June 2, 2004

John F. Niebling
Supervisory Patent Examiner
Technology Center 2800